

## ABSTRACT

### METHOD AND APPARATUS FOR DETERMINING FLOW RATES

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A fibre optic sensor system provides sufficient thermal information to determine the mass flow rates of produced fluids within a well bore, using an optical fibre placed within or adjacent to the well bore without interference with production or prejudicing the integrity of the well. Mass flow rates of fluid in a conduit (20) located in a heat sink  
10 differing in temperature from the fluid are determined by obtaining a distributed temperature profile (32) of fluid flowing along a length of conduit (15) by using optical data obtained from a length of optical fibre in thermal contact therewith, obtaining a profile of the heat sink temperature external to the conduit, and deriving mass flow rates of fluids in the conduit from the said profiles and from measured thermal transfer  
15 parameters.